|  |
| --- |
| THIS DOCUMENT HAS BEEN PREPARED FOR THE PURPOSES OF THE  **PROJECT RESOURCE CENTER**.   IT IS FOR GENERAL GUIDANCE PURPOSES ONLY AND SHOULD NOT BE USED AS A SUBSTITUTE  FOR SPECIFIC TECHNICAL, PROCUREMENT OR LEGAL ADVICE FOR A PROJECT |

# PV Market Study

# Consultant Terms of Reference

## Country and Sector Background

*<Brief country background. Brief description of objectives and scope of [Donor] off grid rural electrification project>*

## Solar PV Program Background

*<Brief description of justifications for PV component, quantitative targets and financing sources>*

## Objective of the Study

The purpose of the study is to assess market demand for PV systems in the various rural subsectors of the country and, considering different business models, system costs and prices, the WTP of consumers in the various regions, subsidy requirements, financing approaches, institutional arrangements and other factors, design a detailed implementation plan for a pilot commercial dissemination program.

The present study will focus on the determination of market demand and other information at the national level and specifically in the selected priority areas. A separate consultant study will focus on designing the detailed implementation plan, based on the results of the market study and other data and information to be compiled.

## Scope of Work

Task 1. Determination of overall market demand and status of the local industry

From available information and survey data on dispersed rural populations, percent electrification, household incomes, poverty levels and the WTP[[1]](#footnote-1), and using appropriate estimation methodologies:

1. Review the current status of the local industry: who are the companies currently in business, their organizational and capitalization structure, business model for marketing, type of equipment marketed, types of customers, sales volume in last few years, current prices of systems, consumer financing terms, rural distribution and maintenance arrangements, marketing problems, financing problems and other constraints encountered.
2. Estimate quantitatively the total potential market for PV in the country for each of the rural subsectors: households, commercial, institutional (schools, clinics, community centers, etc) and productive applications (livestock water supply, micro-irrigation, etc). For the institutional subsector, investigate whether the ministries and agencies concerned have existing or planned assistance programs for unelectrified schools, clinics and other rural public centers, and whether such programs could be used to support PV power supply in these centers. Identify the types of rural productive applications whose energy needs could be feasibly provided by PV. Note that aside from this market estimation at the national level, more detailed estimation focused at the priority areas, must be made (see Task 2 below).
3. Based the results of the preceding analysis, critically review the preliminary program target. Recommend upward or downward adjustment of the targets, as needed.
4. Recommend the range of capacities of SHS (e.g., 20W-smallest, 50W, 100W-largest, etc) that should be marketed under the SPV Program. Estimate the approximate market share nationwide of the different sizes (e.g., 20W-60%, 50W-25%, etc). The results will be used in developing a financing plan for the Program (below).
5. Make an independent estimate of the price buildup of PV systems of different sizes, from hardware cost to sales margin to transport and installation costs, for different regions of the country. First, break down the system hardware into the component panel, controller, battery, lamps, wiring, support structure, etc and estimate their individual costs. Indicate which components need to be imported and which could be obtained locally. Show the breakdown of import cost, custom duties, VAT, etc for the imported components. Estimate cost data from interviews with dealers, data from PV projects elsewhere, international price data, etc. The system prices obtained from this task will be used as starting point for developing a consumer financing plan for the different capacities.
6. Investigate current availability of consumer financing for PV purchase or lease: where they are available, who provides the financing, and at what terms. Identify constraints to expansion of consumer financing and suggest possible approaches.
7. Examine whether the market estimates for the different PV capacities could be further broken down into consumer purchases and fee-for-service or leasing (e.g., does the lower monthly payments over a longer period in a fee-for-service approach tend to increase market demand?)

Note: In estimating market demand for PV by type of application, subsector and geographical area, the consultant must *take into full account the cost and availability of other potential electricity supply alternatives*, including likelihood of grid arrival in the area, diesel and gasoline engine system options, hydro and other isolated system options, etc. Reduce the estimated demand, as needed, to take into account the likelihood of consumers using these alternatives.

Task 2. Definition of market demand in the selected priority areas

The selected communities are the first to benefit from the proposed infrastructure investments under the [Donor] project. The intention is for investments in roads, water and sanitation and electrification to be made in the same locations so that synergies can be exploited and development impact maximized. However, this does not mean that provision of electricity supply, including PV systems, would need to be made in exactly the same communities where the other infrastructure investments will be made. For one, many of the communities are already fully or partly electrified.

1. Estimate the potential market for PV in the unelectrified areas of the selected priority areas for each of the rural subsectors: households, commercial, institutional (schools, clinics, community centers, etc.) and productive applications (livestock water supply, micro-irrigation, etc.). For the institutional subsector, investigate whether the ministries and agencies concerned have existing or planned assistance programs for unelectrified schools, clinics and other rural public centers, and whether such programs could be used to support PV power supply in these centers. Identify the types of rural productive applications whose energy needs could be feasibly provided by PV. In making the estimates, the consultant must *take into full account the cost and availability of other potential electricity supply alternatives*, including likelihood of grid arrival in the area, diesel and gasoline engine system options, hydro and other isolated system options, etc. Reduce the estimated demand, as needed, to take into account the likelihood of consumers using these alternatives.
2. Recommend the specific capacities of SHS that should be marketed in the selected priority areas and estimate their approximate market shares. Estimate the installed cost of each size of PV system in the market areas.
3. Investigate the prevailing market condition for PV in the unelectrified parts of the selected priority areas: a) awareness of residents of the PV option, b) local presence of PV distributors, c) imminent possibility of other electrification alternatives, e.g., grid arrival, isolated diesels, etc.
4. Investigate current availability of consumer financing for PV purchase or lease in the potential markets in the selected priority areas: where they are available, who provides the financing, and at what terms. Identify constraints to expansion of consumer financing and suggest possible approaches.
5. Examine whether the market estimates for the different PV capacities in the selected priority areas could be further broken down into consumer purchases and fee-for-service or leasing (e.g., does the lower monthly payments over a longer period in a fee-for-service approach tend to increase market demand ?)

### Task 3. Definition of Other Program Implementation Components

Given conditions in the country and the relatively small total number units targeted, the business model to be employed, with minor variations to allow for some fee-for-service operations by dealers, will be basically the “dealer model”[[2]](#footnote-2). The model described is patterned after the successful [Donor]-financed [Project name]: two or more qualified private companies will be accredited to participate in the SPV Program. The Program will target a total installation of about 125 kW or about 5,000 units of 25 peak watts average each over the 5-year project life. Participating companies (PCs) would compete to sell PV systems nationally and in designated priority areas. Benefits to the PCs include: a) grants and subsidies for eligible sales, b) technical assistance and market development support, and c) microfinancing assistance to customers. Due to the small total market, sales by the PCs will be allowed anywhere in the country where there is demand but, to focus attention on areas designated as priority by the Government, certain benefits may be extended only to sales in the priority areas. As mentioned earlier, a separate consultant study will flesh out the implementation details of the Program.

The present study should assist that task by developing the following implementation components:

#### 1. Technical standards and certification

Based on international norms (IEC, EC, PV-GAP, etc) provide minimum performance standards that must be met by all PV systems and components to be used in the Program. Based on procedures practiced in other [Donor] projects, recommend a procedure that could be followed by prospective PCs to obtain equipment certification from manufacturers or from managers of other [Donor] projects using similar equipment. For locally manufactured components, especially storage batteries, recommend an acceptable procedure for local testing. Finally, recommend a simple institutional arrangement within the Government to monitor the process and ensure compliance by the PCs.

#### 2. Market development support to participating companies

[Donor] grants may be made available under the SPV Program to finance on cost-shared basis (matching grants) market development support (MDS) activities to develop the market and improve business capability of the PCs. This may include, for example: market surveys, training of local maintenance staff, design and production of promotional materials, holding of promotional events, and others. The consultant should consider specific activities that may be desired by prospective PCs and estimate their costs. Recommend a reasonable MDS total annual amount per PC that could be allocated by the Government from relevant [Donor] grant funds.

#### 3. Strategies to Encourage Marketing Focus on Priority Areas

While PV sales eligible for grant and subsidies will not be geographically limited in the Program, incentives may be provided to PCs to encourage them to market in difficult areas considered priority by the Government. These may include the MDS funding described above, selective microfinancing assistance and others. The consultant should recommend a strategy and describe specific incentives to PCs that could achieve the desired market focus.

## Consultant qualifications and work organization

The consultant must have specific experience in the applications of photovoltaic systems for rural electrification. He is expected to be familiar not only with the technical aspects of photovoltaic systems but also with social, economic and financial considerations associated with the marketing of PV systems in rural areas of developing countries. Knowledge of specific conditions in the country is desirable. Many studies and documents on this subject are already available. The consultants should exert best efforts to collect all such available references to avoid repeating data gathering or analysis already done by others.

The consultant is expected to consult closely with the consultant chosen for the implementation design, during the conduct of the study and at its conclusion, when findings and results of the market study that would form the basis of the implementation design are finalized. The [Donor]/Government team will supervise execution of the study.

## Outputs (Deliverables) and schedule of payment

Contract signing: 10% of total contract amount.

1. Inception report—after country visit during which time discussions are held with Government and other relevant agencies, interviews are made with local PV companies and familiarization visits are made to selected rural sites, an inception report will be prepared and submitted to the [Donor]/Government team, containing a detailed description of how the study will be carried out by the consultant : 10%
2. Progress report 1: completed Task 1—30%
3. Progress report 2: completed Tasks 2 and 3 — 30%
4. Draft final report — 20% upon submission of an acceptable draft final report incorporating comments by the [Donor]/Government team.

## Timetable and Budget

The assignment should be completed on or before [date]. The total budget should not exceed [number], inclusive of travel to the country, report preparation and all other costs.

1. Estimated from results of existing demand study and from relevant survey data from the power utility. [↑](#footnote-ref-1)
2. The dealer model and the fee-for-service model are the two general business models currently used in PV marketing worldwide. The fee-for-service model is best exemplified by the case of a [Donor] project in [Country], where one concessionaire has exclusive right to provide PV service to all customers in a province over 15-20 year period. The systems continue to be the property of the concessionaire. The dealer model is one where customers make cash or credit purchases of PV systems. As soon as paid, the system is owned by the purchaser. There are, of course, possible variations to these modalities. For example, the concessionaire in a fee-for-service operation may also sell PV systems to certain consumers who desire it. In the country, as already mentioned, one of the PV dealers offers both fee-for-service and direct sales of systems. [↑](#footnote-ref-2)